The Effects of Domestication on Competitive Dominance of Juvenile Spring Chinook Salmon

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Domestication

- Raising fish in hatcheries can cause unintended behavioral changes in salmonids due to domestication selection
- Change in genetics due to selection in an artificial environment; Natural selection in an artificial environment

If domestication does occur, we would expect…

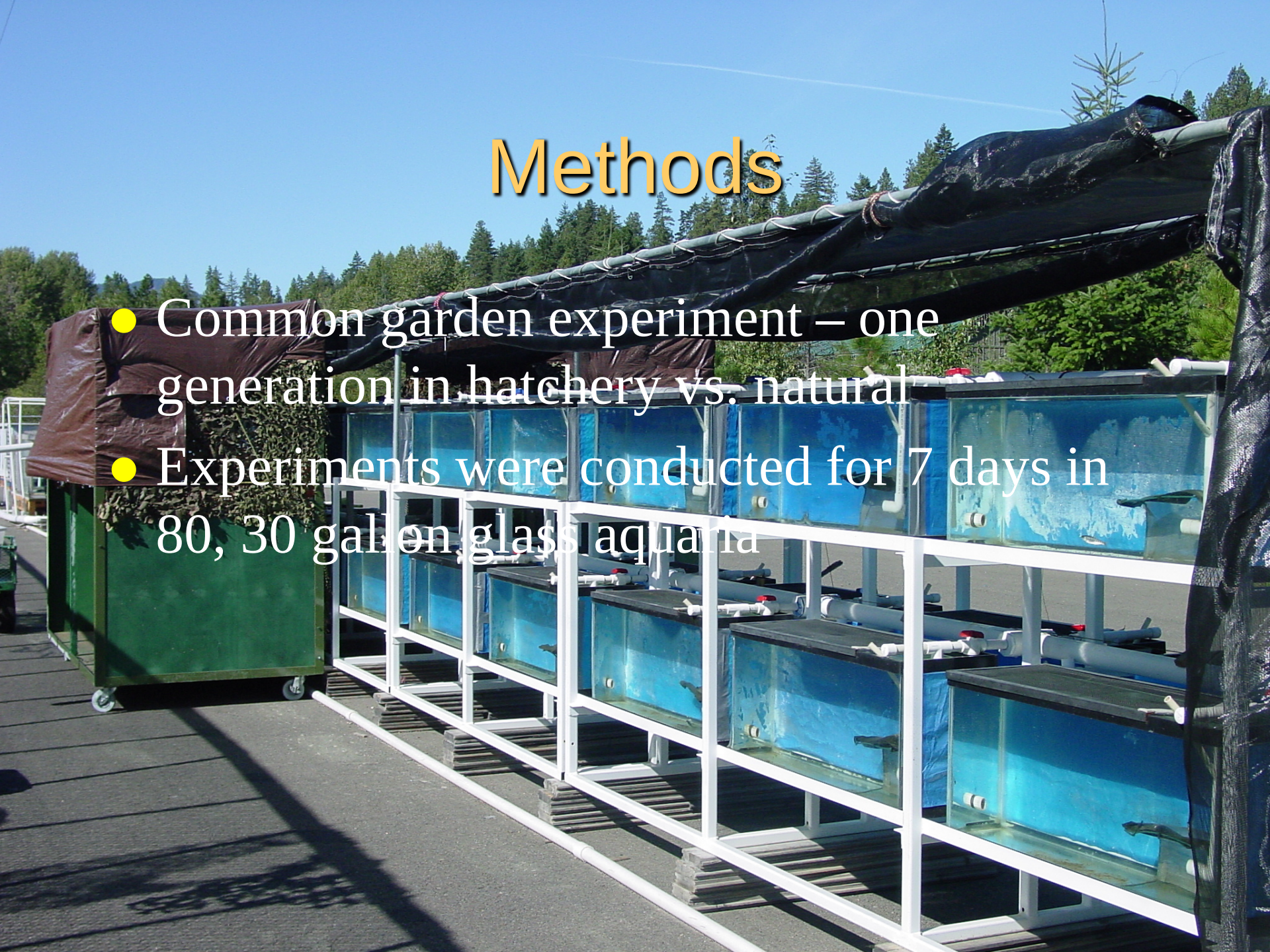
- offspring of hatchery fish to be dominant in scramble competition

- offspring of wild fish to be dominant in contest competition

Purpose

- Determine if there are differences in dominance between offspring of wild and first generation hatchery upper Yakima basin spring chinook salmon under contest and scramble competition

Methods

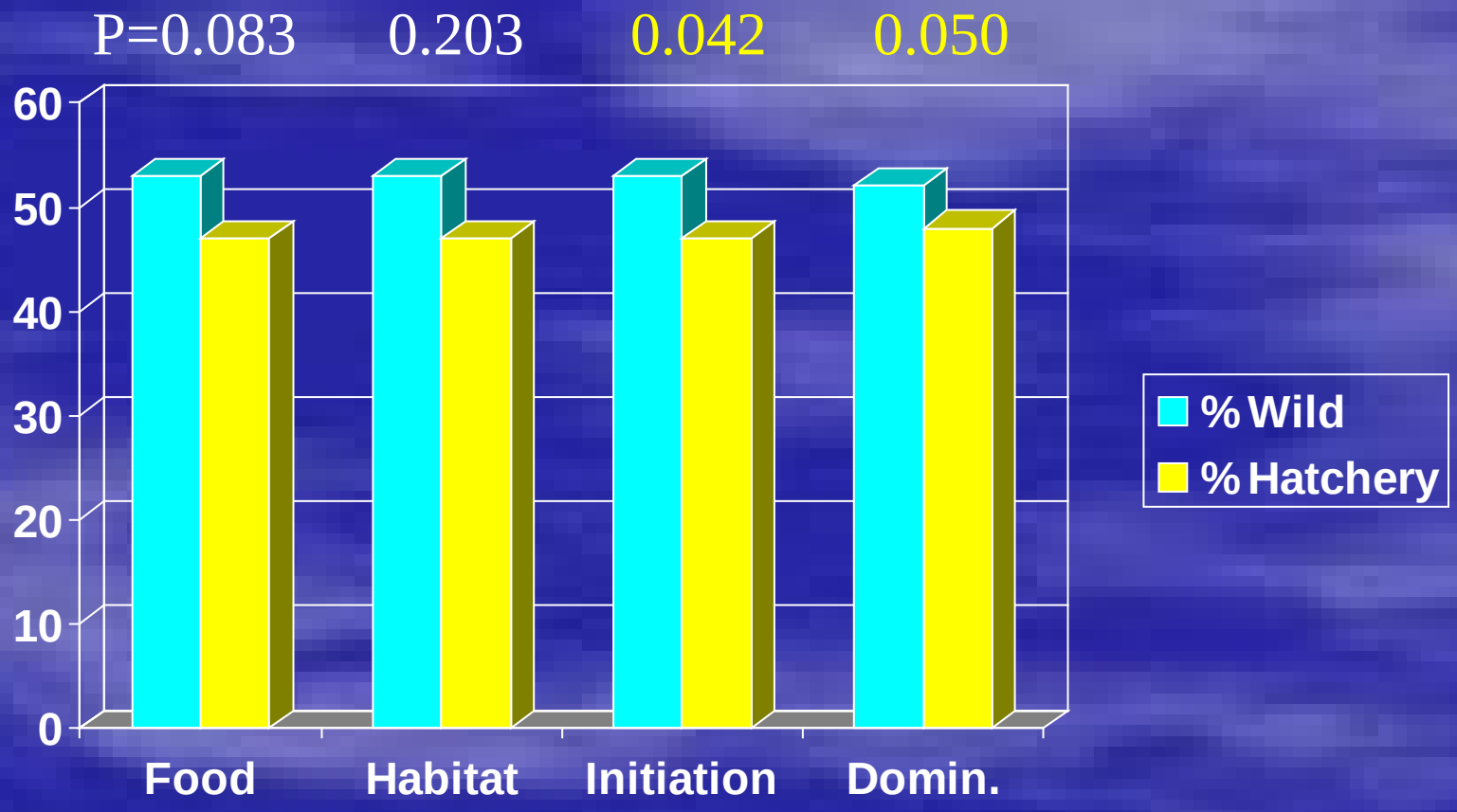


- Common garden experiment – one generation in hatchery vs. natural
- Experiments were conducted for 7 days in 80, 30 gallon glass aquaria

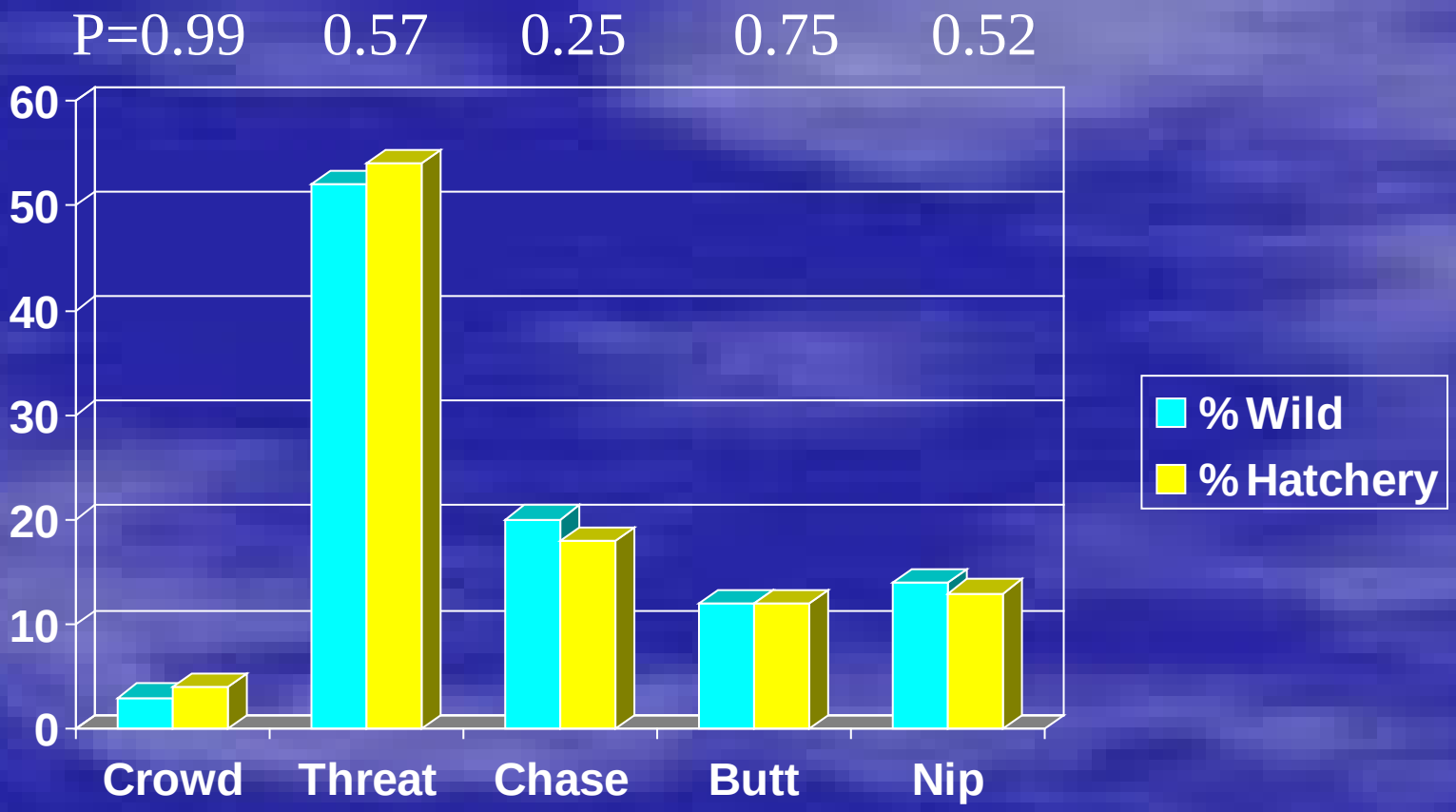
Experimental Arenas

- Contest – one good spot
- Scramble – all spots equal

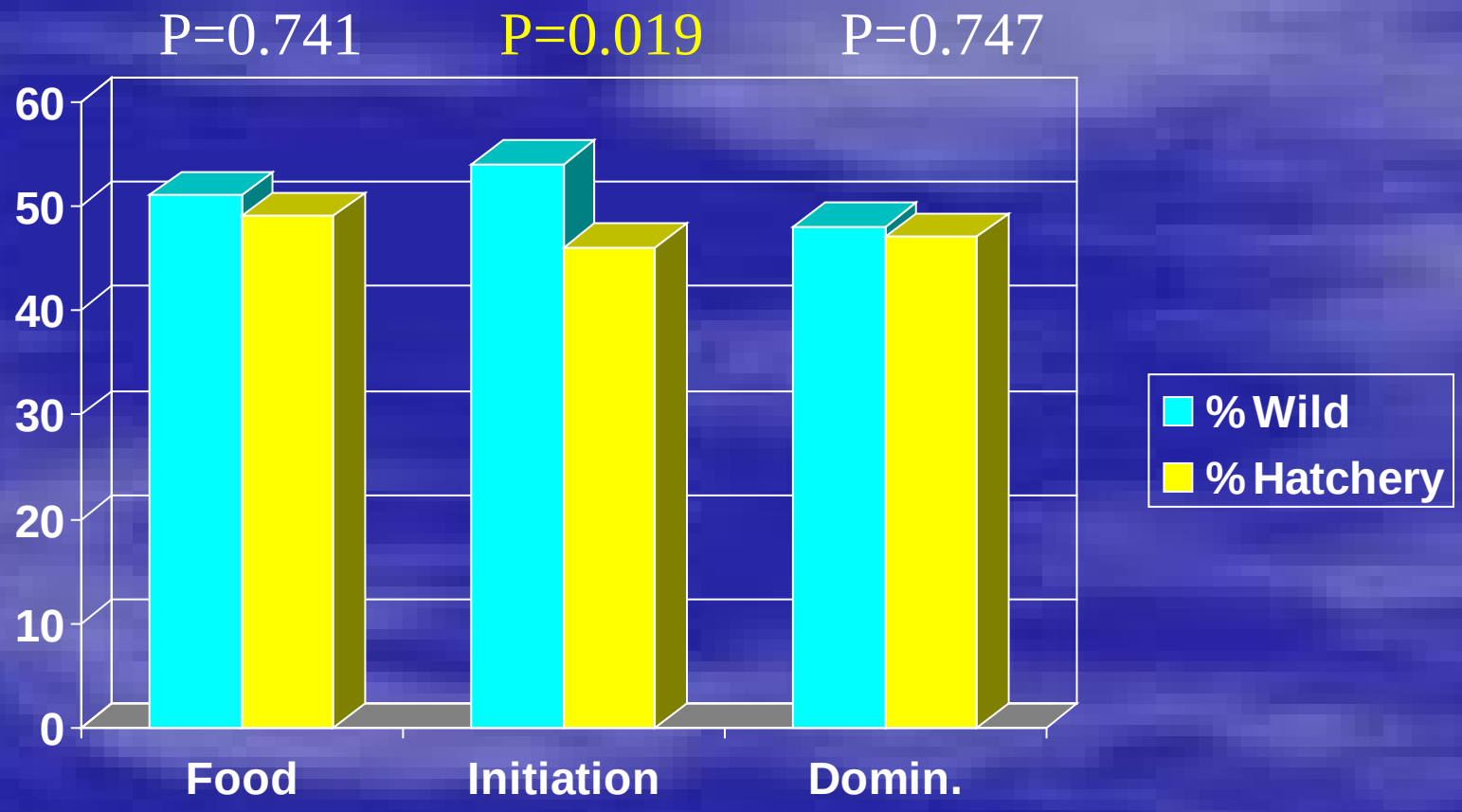
Contest Competition n=505



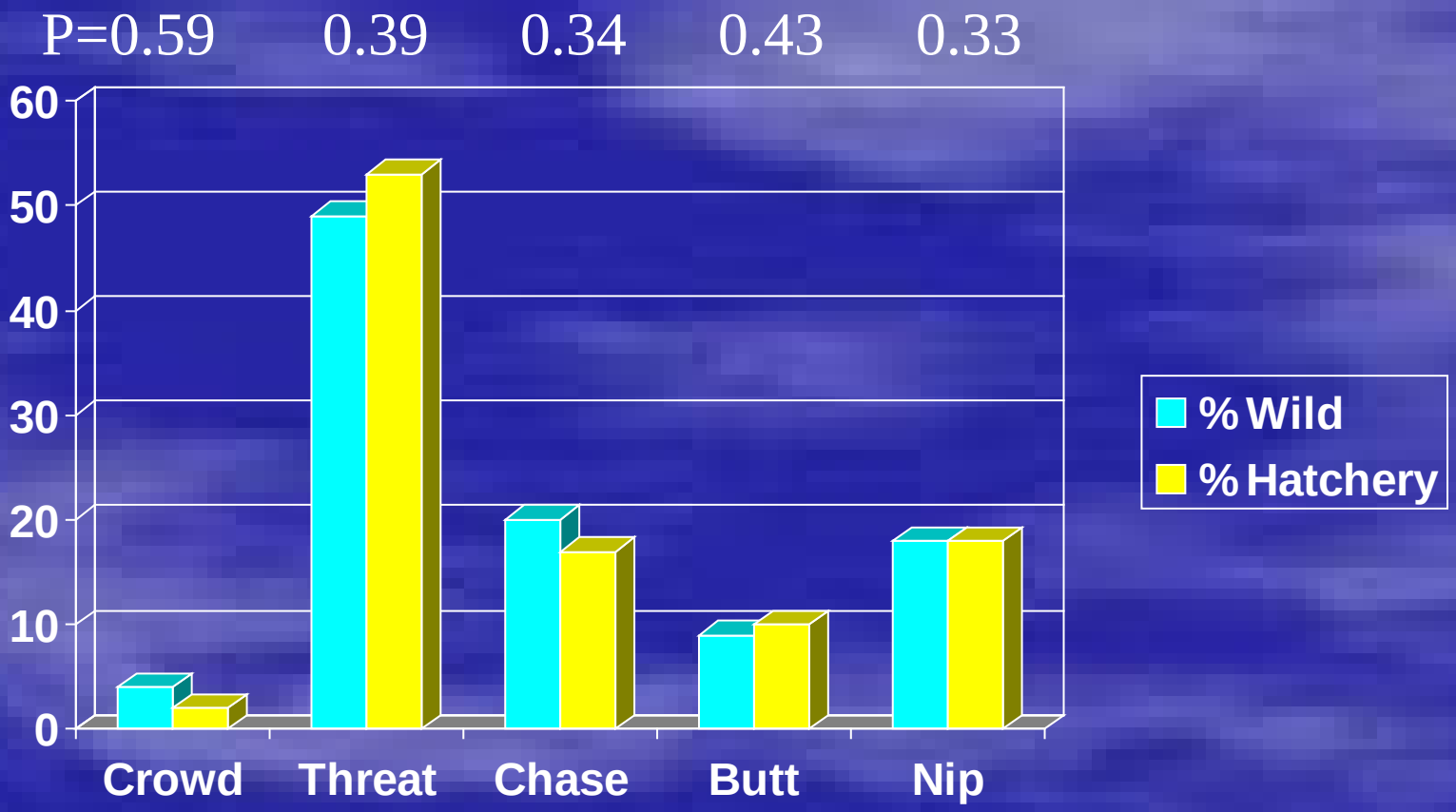
Interaction Type (C) n=15,110



Scramble Competition n=363



Interaction Type (S), n=11,939



Growth

- Dominant fish grew more than subordinates in both contest and scramble trials regardless of origin ($P<0.05$)
- No difference in growth between origins when tested separately

Summary

- Offspring of wild fish dominated 4% more contests than offspring of hatchery fish, but differences were not detected in scramble trials
- Offspring of wild fish were more aggressive in both contest and scramble trials
- Types of agonistic behaviors used by offspring of hatchery and wild fish were similar
- Dominant fish grew the most
- Dominance rates may change if differences in time and size of emergence or growth rates differ